

***ABBREVIATED PRELIMINARY ASSESSMENT***

***ORIOLE MINE***



Colville National Forest  
Sullivan Lake Ranger District  
Pend Oreille County, WA

June, 2004

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## **EXECUTIVE SUMMARY**

The Forest Service performed an Abbreviated Preliminary Assessment for the Oriole Mine (Site) to determine the need for further site characterization. The Site is located along Linton Creek approximately 1 mile northwest of Metaline, WA on the Sullivan Lake Ranger District of the Colville National Forest. Linton Creek flows into the Pend Oreille River at Metaline. The Site is situated on moderate side slopes at an elevation of 2,800 ft. above mean sea level (MSL).

Soil samples were collected from a waste rock dump and an ore bin for bench testing using a Niton XRF unit. Water and sediment samples were not collected as part of this investigation.

Lead concentrations in material from the waste rock dump exceeded both Washington's Model Toxics Control Act (MTCA) Method A cleanup levels and EPA Region IX Preliminary Remediation Goals (PRGs) for industrial properties. Similarly, concentrations of arsenic and lead in the ore bin material exceeded both MTCA Method A cleanup levels and PRGs. Cadmium concentrations in the ore bin material exceeded MTCA Method A cleanup goals and antimony concentrations exceeded PRGs as well. Cadmium, lead, nickel, selenium, tin, zinc, and possibly arsenic exceeded soil concentrations established under MTCA to be protective of terrestrial ecological receptors at most sites. However, exceedence of ecological receptor values does not necessarily trigger cleanup actions.

Based on the results of this sampling effort and the proximity of the site to potential targets in Metaline, WA, it is recommended that a Site Inspection (SI) be performed.

## **1.0 INTRODUCTION**

An Abbreviated Preliminary Assessment (APA) was performed by the US Forest Service in accordance with the EPA “Guidance for Performing Preliminary Assessments Under CERCLA”, EPA “Improving Site Assessment: Abbreviated Preliminary Assessments” of 1999, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the Superfund Amendments and Reauthorization Act (SARA) of 1986, and the National Contingency Plan as outlined in 40 CFR Parts 300.410(c)(1)(i-v).

The purpose of this assessment was to determine whether or not there is a potential for a release of contaminants to the environment and/or to human health. The purpose of an APA is to determine whether further site characterization is warranted. A Niton XRF 700 Series was utilized to help in the preliminary screening of this Site.

## **2.0 SITE DESCRIPTION, OPERATIONAL HISTORY, AND WASTE CHARACTERISTICS**

The Oriole Mine is located approximately 1 mile northwest of Metaline, WA on the Sullivan Lake Ranger District of the Colville National Forest. The Site lies along Linton Creek which flows into the Pend Oreille River at Metaline. The Site falls within the Metaline mining district.

Location information:

Lat./Long.:	N48° 51' 37" W118° 24' 47"
Legal:	Willamette Meridian, T 39 N, R 43 E, Section 19, SE ¼, SE ¼
USGS quadrangle:	Metaline

Hunting (1954) reported 2,000 ft. of development workings mainly in 3 adits at the Site. The workings explore quartz lenses up to 3 ft. wide and 20 ft. long along a gouge breccia seam in dolomitic host rock. The main commodities produced at the Site were zinc, lead, copper, silver, and gold (Derkey and others, 1990). The primary ore minerals at the Site are sphalerite, galena, tetrahedrite, chalcopyrite, azurite, smithsonite, cerussite, and bornite; gangue minerals include pyrite, malachite, quartz, calcite, dolomite, and sericite (Derkey and others, 1990). The mine produced in 1911, 1912, 1925, 1926, and 1953; total production up to 1942 amounted to 2,000 tons of ore (Hunting, 1954). Smelter returns on a carload of hand-picked ore were 42.1 oz/ton Ag, 21.9%Zn, 15.3% Pb, and 1.12% Cu (Hunting, 1954).

At present, the Site consists of three adits and an inclined shaft/stope with associated waste rock dumps. Two adits and the original discovery shaft/stope are located west of Linton Creek and one short adit east of the creek. All of the openings west of the creek were closed with bat-friendly structures by the US Forest Service in 1999. Approximately 10 gpm of neutral pH discharge has been noted from the lowest adit on the west side of the Creek. The remains of an ore bin or load out facility still exists below the dump of this adit.

Access to the Site can be accomplished from Metaline, WA by taking Linton Creek Road (County Route 2905) to the northwest for one mile to the junction with the 411 Spur of Forest Service Route 1710. Follow the 411 Spur for ¼ mile to the mine site.

Currently, the Site is inactive and unclaimed.

### **3.0 SITE SAMPLING AND TEST RESULTS**

#### **Soil Samples**

A Niton XRF, XL-722S was used to assess composite grab samples taken from a waste rock dump and ore bin at the Site. Samples collected for bench testing were collected in accordance with EPA Method 6200. Surface soils were removed to approximately 4 to 6 inches below grade in order to get below highly oxidized surface layers. Rocks, debris and other deleterious materials were removed. Samples were then collected, bagged, and labeled. Samples were later dried and prepared for bench testing using the Niton XRF.

A summary of the analytical results compared to Washington's Model Toxics Control Act (MTCA) Method A cleanup standards for industrial soils, EPA Region IX Preliminary Remediation Goals (PRGs), and Washington's MTCA simplified ecological evaluation standards as outlined in Appendix A

Lead concentrations in material from the waste rock dump exceeded both MTCA Method A cleanup levels and EPA Region IX PRGs for industrial properties (Appendix A). Similarly, concentrations of arsenic and lead in the ore bin material exceeded both PRGs and MTCA Method A cleanup levels (Appendix A). Cadmium concentrations in the ore bin material exceeded MTCA Method A cleanup goals and antimony concentrations exceeded PRGs as well (Appendix A). Cadmium, lead, nickel, selenium, tin, zinc, and possibly arsenic exceeded soil concentrations established under MTCA to be protective of terrestrial ecological receptors at most sites (Appendix A). However, exceedence of ecological receptor values does not necessarily trigger cleanup actions.

### **4.0 SUMMARY**

The Site is contaminated and in close proximity to potential targets in Metaline, WA. Lead, arsenic, cadmium, and antimony concentrations in mine waste rock and/or the ore bin exceeded MTCA Method A cleanup goals and/or EPA Region IX PRGs for industrial properties. Closure of the third adit portal should be considered to prevent potential future liabilities associated with the general public recreating at the Site.

### **5.0 RECOMMENDATION**

Based on bench sampling of the material from the waste dump with the Niton XRF unit and EPA's APA Checklist (Appendix A), it is recommended that a Site Inspection (SI) be completed. As part of this inspection, a thorough study of the area to determine the extent of contamination is warranted. The area should be sampled to determine the presence of waste material and tailings, and if present, the potential waste piles and tailings should be sampled at depth and a determination of volumes should be calculated. An analysis of total and available metals as well as acid base accounting (ABA) is required for any waste rock or tailings identified at the Site. Sampling of impacted and un-impacted surface waters and pore waters from stream gravels for total and dissolved metals is expected. In addition, stream sediments and benthic macroinvertebrates would be sampled.

Appendix C contains additional photos of the Site.

## REFERENCES

- Derkey, R.E., Joseph, N.L., and Lasmanis, R., 1990, Metal mines of Washington-preliminary report: Washington Department of Natural Resources, Division of Geology and Earth Resources Open File Report 90-18. 577 p.
- Hunting, M.T., 1956, Inventory of Washington minerals – Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin No. 37, v. 1, 428 p.

## **Appendix A**

### **NITON XRF ANALYTICAL DATA SUMMARY**

**Table 1.** Analytical results from waste rock pile #1 at Oriole.

SAMPLE	ANALYTE	ANALYTICAL RESULT (mg/kg)	MTCA Method A (mg/kg) <sup>1</sup>	EPA REGION IX PRG (mg/kg) <sup>2</sup>	SIMPLIFIED ECOLOGICAL EVALUATION (mg/kg) <sup>3</sup>
Waste Rock #1	Total Arsenic	ND	20	Noncancer – 260 Cancer - 1.6	
	Arsenic III				20
	Arsenic V				260
	Cadmium	ND	2	450	36
	Total Chromium	ND		450	135
	Chromium VI		19	64	
	Chromium III		2,000	100,000	
	Lead	<b>1,689.6</b>	1,000	750	220
	Mercury	ND	2	310	Inorganic - 9 Organic - .7
	Antimony	110.5		410	--
	Cobalt	ND		1,900	--
	Copper	ND		41,000	550
	Iron	20,198.4		100,000	--
	Manganese	2,348.8		19,000	23,500
	Molybdenum	ND		5,100	71
	Nickel	896		20,000	1,850
	Selenium	ND		5,100	.8
	Silver	ND		5,100	--
	Tin	351.6		100,000	(275)
	Zinc	4,627.2		100,000	570

<sup>1</sup> From WAC 173-340-900, Table 745-1, Method A Cleanup Levels for Industrial Properties.

<sup>2</sup> From EPA, Region IX, Preliminary Remediation Goals, 10/1/2002.

<sup>3</sup> From WAC 173-340-900, Table 749-2, Priority Contaminants of Ecological Concern for Sites that Qualify for the Simplified Terrestrial Ecological Evaluation Procedure. All concentrations are for industrial/commercial sites; if unavailable, unrestricted land use values denoted with parenthesis ( ) were utilized.



**Table 2.** Analytical results from ore bin at Oriole.

SAMPLE	ANALYTE	ANALYTICAL RESULTS (mg/kg)	MTCA Method A (mg/kg) <sup>1</sup>	EPA REGION IX PRG (mg/kg) <sup>2</sup>	SIMPLIFIED ECOLOGICAL EVALUATION (mg/kg) <sup>3</sup>
Ore bin	Total Arsenic	<b>568.4</b>	20	Noncancer – 260 Cancer – 1.6	
	Arsenic III				20
	Arsenic V				260
	Cadmium	<b>154</b>	2	450	36
	Total Chromium	ND		450	135
	Chromium VI		19	64	
	Chromium III		2,000	100,000	
	Lead	<b>16,800</b>	1,000	750	220
	Mercury	ND	2	310	Inorganic - 9 Organic - .7
	Antimony	<b>694</b>		410	--
	Cobalt	ND		1,900	--
	Copper	ND		41,000	550
	Iron	41,100		100,000	--
	Manganese	3,788.8		19,000	23,500
	Molybdenum	ND		5,100	71
	Nickel	2,259.2		20,000	1,850
	Selenium	95.4		5,100	.8
	Silver	260.4		5,100	--
	Tin	207.4		100,000	(275)
	Zinc	32,800		100,000	570

<sup>1</sup> From WAC 173-340-900, Table 745-1, Method A Cleanup Levels for Industrial Properties.

<sup>2</sup> From EPA, Region IX, Preliminary Remediation Goals, 10/1/2002.

<sup>3</sup> From WAC 173-340-900, Table 749-2, Priority Contaminants of Ecological Concern for Sites that Qualify for the Simplified Terrestrial Ecological Evaluation Procedure. All concentrations are for industrial/commercial sites; if unavailable, unrestricted land use values denoted with parenthesis ( ) were utilized.

## **Appendix B**

### **ABBREVIATED PRELIMINARY ASSESSMENT CHECKLIST**

## ABBREVIATED PRELIMINARY ASSESSMENT CHECKLIST

This checklist can be used to help the site investigator determine if an Abbreviated Preliminary Assessment (APA) is warranted. This checklist should document the rationale for the decision on whether further steps in the site assessment process are required under CERCLA. Use additional sheets, if necessary.

**Checklist Preparer:** Greg Graham, Geologist for  
Dennis Boles, Environmental Engineer June 1, 2004  
 (Name/Title) (Date)

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 (E-Mail Address)

**Site Name:** Oriole Mine

**Previous Names (if any):** N/A

**Site Location:** The Site is located along Linton Creek approximately 1 mile northwest of Metaline, WA on the Sullivan Lake Ranger District of the Colville National Forest.

**Legal Description:** Willamette Meridian, T 39 N, R 43 E, Section 19, SE ¼, SE ¼  
Latitude: N48° 51' 37" Longitude: W118° 24' 47"

**Describe the release (or potential release) and its probable nature:** The material in the mine waste dumps is contaminated. The following elements exceed MTCA Method A cleanup goals and/or EPA Region IX PRGs for industrial properties:

Arsenic – 568.4 mg/kg (MTCA Method A-20; PRG-1.6 noncancer endpoint, 260 cancer endpoint)

Cadmium – 154 mg/kg (MTCA Method A-2; PRG-450)

Lead – 1,689.6-16,800 mg/kg (MTCA Method A-1,000; PRG-750)

Antimony – 694 mg/kg (PRG-410; No MTCA cleanup goal).

Cadmium, lead, nickel, selenium, tin, zinc, and possibly arsenic exceeded soil concentrations established under MTCA to be protective of terrestrial ecological receptors at most sites.

### Part 1 - Superfund Eligibility Evaluation

<b>If All answers are “no” go on to Part 2, otherwise proceed to Part 3</b>	<b>YES</b>	<b>NO</b>
1. Is the site currently in CERCLIS or an “alias” of another site?		<b>X</b>
2. Is the site being addressed by some other remedial program (Federal, State, or Tribal)?		<b>X</b>
3. Are the hazardous substances potentially released at the site regulated under a statutory exclusion (i.e., petroleum, natural gas, natural gas liquids, synthetic gas usable for fuel, normal application of fertilizer, release located in a workplace, naturally occurring, or regulated by the NRC, UMTRCA, or OSHA)?		<b>X</b>
4. Are the hazardous substances potentially released at the site excluded by policy considerations (i.e., deferred to RCRA corrective action)?		<b>X</b>
5. Is there sufficient documentation to demonstrate that no potential for a release that could cause adverse environmental or human health impacts exist (i.e., comprehensive remedial investigation equivalent data showing no release above ARAR's, completed removal action, documentation showing that no hazardous substance release have occurred, or an EPA approved risk assessment completed)?		<b>X</b>

Please explain all “yes” answer(s). \_\_\_\_\_

### **Part 2 - Initial Site Evaluation**

For Part 2, if information is not available to make a “yes” or “no” response, further investigation may be needed. In these cases, determine whether an APA is appropriate. Exhibit 1 parallels the questions in Part 2. Use Exhibit 1 to make decisions in Part 3.

<b>If the answer is “no” to any questions 1, 2, or 3, proceed directly to Part 3.</b>	<b>YES</b>	<b>NO</b>
1. Does the site have a release or a potential to release?	X	
2. Does the site have uncontained sources containing CERCLA eligible substances?	X	
3. Does the site have documented on-site, adjacent, or nearby targets?	X	

<b>If the answers to questions 1, 2, and 3 above were all “yes” then answer the questions below before proceeding to Part 3.</b>	<b>YES</b>	<b>NO</b>
4. Does documentation indicate that a target (i.e., drinking water wells, drinking surface water intakes, etc.) has been exposed to a hazardous substance released from the site?		X
5. Is there an apparent release at the site with no documentation of exposed targets, but there are targets on site or immediately adjacent to the site?	X	
6. Is there an apparent release and no documented on-site targets or targets immediately adjacent to the site, but there are nearby targets (i.e., targets within 1 mile)?	X	
7. Is there no indication of a hazardous substance release, and there are uncontained sources containing CERCLA hazardous substances, but there is a potential to release with targets present on site or in proximity to the site?	X	

**Notes:**

## EXHIBIT 1

### SITE ASSESSMENT DECISION GUIDELINES FOR A SITE

Exhibit 1 identifies different types of site information and provides some possible recommendations for further site assessment activities based on that information. You will use Exhibit 1 in determining the need for further action at the site, based on the answers to the questions in Part 2. Please use your professional judgment when evaluating a site. Your judgment may be different from the general recommendations for a site given below.

<b>Suspected/Documented Site Conditions</b>		<b>APA</b>	<b>FULL PA</b>	<b>PA/SI</b>	<b>SI</b>
1. There are no releases or potential to release.		Yes	No	No	<b>No</b>
2. No uncontained sources with CERCLA-eligible substances are present on site.		Yes	No	No	<b>No</b>
3. There are no on-site, adjacent, or nearby targets		Yes	No	No	<b>No</b>
4. There is documentation indicating that a target (i.e., drinking water wells, drinking surface water intakes, etc.) has been exposed to a hazardous substance released from the site.	Option 1: APA    SI	Yes	No	No	Yes
	Option 2: PA/SI	No	No	Yes	<b>No</b>
5. There is an apparent release at the site with no documentation of exposed targets, but there are targets on site or immediately adjacent to the site.	Option 1: APA    SI	Yes	No	No	<b>Yes</b>
	Option 2: PA/SI	No	No	Yes	N/A
6. There is an apparent release and no documented on-site targets and no documented immediately adjacent to the site, but there are nearby targets. Nearby targets are those targets that are located within 1 mile of the site and have a relatively high likelihood of exposure to a hazardous substance migrating from the site.		No	Yes	No	<b>No</b>
7. There is no indication of a hazardous substance release, and there are uncontained sources containing CERCLA hazardous substances, but there is a potential to release with targets present on site or in proximity to the site.		No	Yes	No	<b>No</b>

### **Part 3 - EPA Site Assessment Decision**

When completing Part 3, use Part 2 and Exhibit 1 to select the appropriate decision. For example, if the answer to question 1 in Part 2 was “no,” then an APA may be performed and the “NFRAP” box below should be checked. Additionally, if the answer to question 4 in Part 2 is “yes,” then you have two options (as indicated in Exhibit 1): Option 1 -- conduct an APA and check the “Lower Priority SI” or “Higher Priority SI” box below; or Option 2 -- proceed with a combined PA/SI assessment.

**Check the box that applies based on the conclusions of the APA:**

- |  |  |
|--|--|
| <input type="checkbox"/> NFRAP                         | <input type="checkbox"/> Refer to Removal Program – further site assessment needed |
| <input checked="" type="checkbox"/> Higher Priority SI | <input type="checkbox"/> Refer to Removal Program – NFRAP                          |
| <input type="checkbox"/> Lower Priority SI             | <input type="checkbox"/> Site is being addressed as part of another CERCLIS site   |
| <input type="checkbox"/> Defer to RCRA Subtitle C      | <input type="checkbox"/> Other: _____  |
| <input type="checkbox"/> Defer to NRC                  |  |

Regional EPA Reviewer: N/A \_\_\_\_\_  
Print Name/Signature Date

**PLEASE EXPLAIN THE RATIONALE FOR YOUR DECISION:**

The Site is contaminated and in close proximity to potential targets in Metaline, WA. Lead concentrations in material from the waste rock dump exceeded both Washington's Model Toxics Control Act (MTCA) Method A cleanup levels and EPA Region IX Preliminary Remediation Goals (PRGs) for industrial properties. Similarly, concentrations of arsenic and lead in the ore bin material exceeded both PRGs and MTCA Method A cleanup levels. Cadmium concentrations in the ore bin material exceeded MTCA Method A cleanup goals and antimony concentrations exceeded PRGs as well. Cadmium, lead, nickel, selenium, tin, zinc, and possibly arsenic exceeded soil concentrations established under MTCA to be protective of terrestrial ecological receptors at most sites. However, exceedence of ecological receptor values does not necessarily trigger cleanup actions.

**NOTES:**

## **Appendix C**

### **ADDITIONAL SITE PHOTOS**

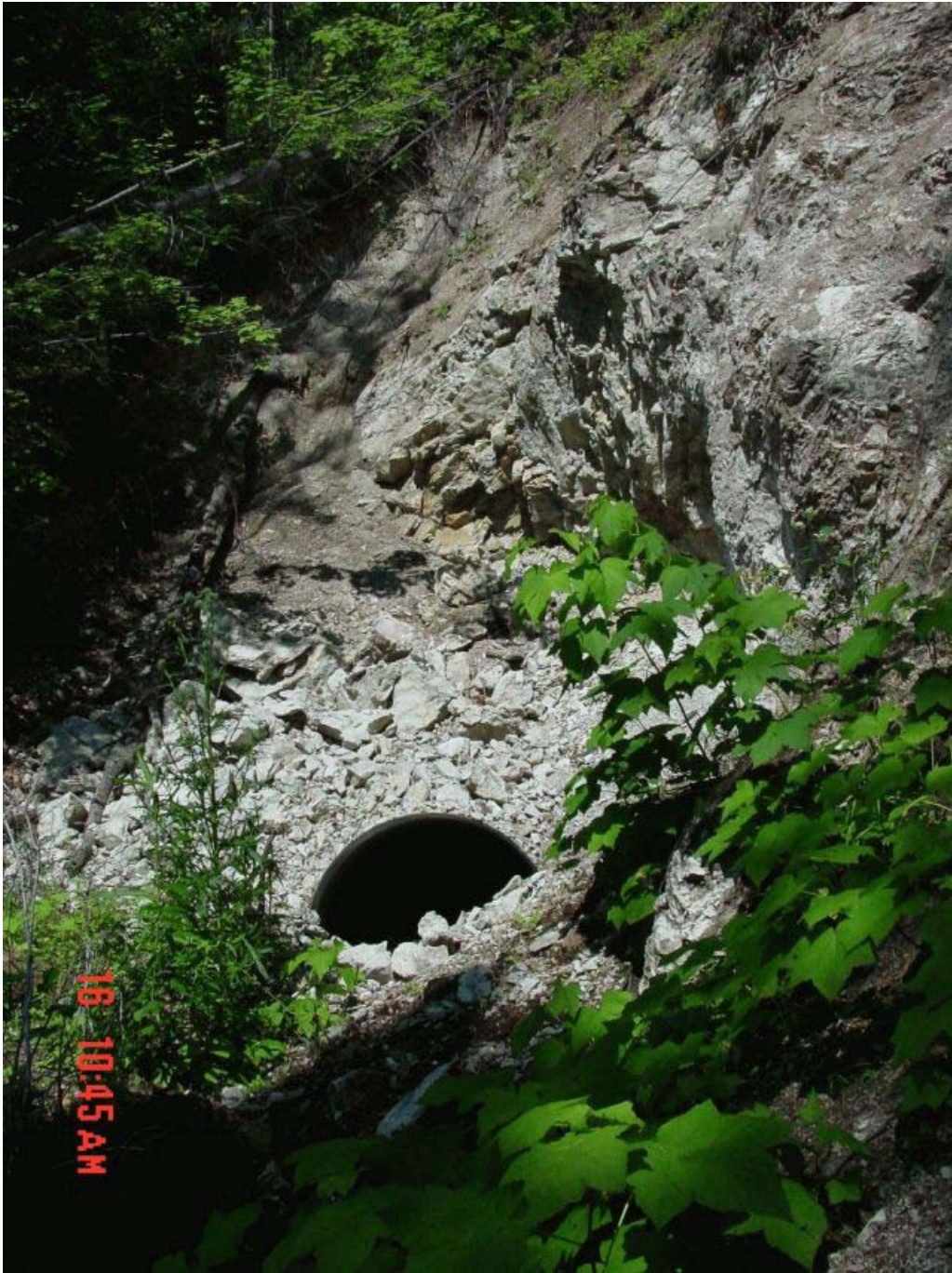


Photo 1. Lower adit portal at the Oriole mine (photo by R. Lentz, 7/16/2002).